

REMARKS/ARGUMENTS

Claims 1-9, 11-21, 34, 36 and 37 are pending in the application. Claims 10 and 35 have been cancelled. Non-elected Claims 22-33 stand withdrawn by the Examiner.

By the present Amendment, Claim 1 has been amended to recite a film directly deposited on a non-seed layer substrate consisting essentially of IrMnN having a (200) texture.

Independent Claim 9 has been amended to recite a layered magnetic structure comprising: a non-seed layer substrate; a layer consisting essentially of IrMnN having a (200) texture directly deposited on the substrate; and a ferromagnetic layer deposited on the IrMnN layer, wherein the structure has a blocking temperature of greater than 300°C.

Independent Claim 34 has been amended to recite a method of making a layered magnetic structure comprising: directly depositing a layer consisting essentially of IrMnN having a (200) texture on a non-seed layer substrate; and depositing a ferromagnetic layer on the IrMnN layer, wherein the structure has a blocking temperature of greater than 300°C.

Basis for the amended “directly deposited” and “non-seed layer” claim language is provided in the specification, for example, at page 3, lines 27-29, and page 6, lines 21-33. Some non-limiting embodiments of IrMnN films directly deposited on substrates without a seed layer are illustrated in Figs. 4, 6 and 7.

Claims 1-8 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Lin et al. '170 in view of Fuke et al. '049. According to the Office Action, Lin et al. '170 discloses a film comprising an Mn alloy layer (i.e., IrMnNi) having a (200) texture. The Office Action acknowledges that Lin et al. '170 fails to disclose a Mn alloy consisting essentially of IrMnN film, and relies upon Fuke et al. '049 as an alleged teaching of the use of an Mn alloy consisting essentially of IrMnN films as an antiferromagnetic material for use in magnetic heads since such an alloy possesses good corrosion resistance.

The Office Action notes that the rejected claims are open to structures in which seed layers/underlayers are present to induce the claimed (200) texture. The Office Action suggests the inclusion of additional structural limitations wherein the IrMnN layer is claimed to be directly deposited on a non-seed layer/underlayer. By the present Amendment, independent Claims 1, 9 and 34 have been amended to recite such a direct deposition feature. It is submitted that independent Claims 1, 9 and 34, as amended, distinguish over the prior art of record.

Lin et al. '170 discloses a spin valve sensor including an anti-ferromagnetic pinning layer, e.g., element number 214 in Fig. 13. Lin et al. '170 discloses that the anti-ferromagnetic pinning layer 214 is made of nickel manganese (Ni-Mn) or nickel manganese-based alloys (Ni-Mn-M) where M is a third metallic element such as chromium, iron, iridium, palladium, platinum, rhodium and ruthenium (see page 2, paragraph [0014]). Thus, Lin et al. '170 teaches that the anti-ferromagnetic pinning layer must include Ni and Mn, and may optionally include a third metal selected from Cr, Fe, Ir, Pd, Pt, Rh and Ru.

Lin et al. '170 further discloses that a nickel oxide first seed layer (layer number 304 in Fig. 13) has a {200} crystalline texture, which is said to induce a {200} crystalline texture of the subsequently deposited layers of the spin valve sensor (see paragraph [0050], pages 4 and 5). Lin et al. '170 thus teaches that the {200} texture of the nickel oxide seed layer 304 causes the other layers of the structure to have a similar texture. The NiMn-based layer of Lin et al. '170 does not tend to grow with a (200) orientation. Absent the seed layer 304, Lin et al. '170 indicates that the remaining layers would not tend to form a {200} texture. This is directly contrary to the presently claimed IrMnN film having a (200) texture in which the film is directly deposited on a non-seed layer substrate.

Fuke et al. '049 discloses an anti-ferromagnetic film comprising an IrMn alloy. At column 5, lines 33-38, Fuke et al. '049 discloses that the IrMn alloy may include additive components such as Ni, Cu, Ta, Hf, Pd, Ti, Nb, Cr, Si, Al, W, Zr, Ga, Be, In, Sn, V, Mo, Re, Co, Ru, Rh, Pt, Ge, Os, Ag, Cd, Zn, Au and N. Although N is one of the many elements listed in the reference, no IrMnN compositions were actually made in any of the examples of Fuke et al. '049. Furthermore, contrary to the presently claimed invention, Fuke et al. '049 states that the disclosed IrMn anti-ferromagnetic film forms a (111) plane orientation (see column 4, lines 59-62). Thus, to the extent that Fuke et al. '049 discloses an IrMn alloy that could possibly contain N, the reference makes clear that such a film would have a (111) orientation rather than the presently claimed (200) orientation.

The presently claimed invention distinguishes over Lin et al. '170 and Fuke et al. '049. The film recited in Claim 1 consists essentially of IrMnN having a (200) texture directly deposited on a non-seed layer substrate. Unlike prior art layered structures in which a seed layer is required to produce the (200) texture, the presently claimed film naturally forms the (200)

texture upon deposition without a seed layer. It is therefore submitted that Claim 1, and the claims that depend therefrom, are patentable over Lin et al. '170 and Fuke et al. '049.

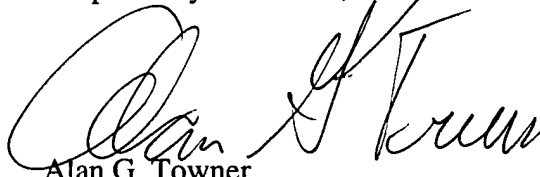
Claims 9, 11-13, 15, 17-21, 34, 36 and 37 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Lin et al. '170 in view of Fuke et al. '049, and further in view of Tanaka et al. (*IEEE Trans. Mag.*), Xue et al. '592, Anderson et al., Barnard, et al '580 and Fuke et al (*App. Phys. Let.*). This rejection is respectfully traversed.

Independent Claims 9 and 34, as amended, recite a layered magnetic structure comprising a layer consisting essentially of IrMnN having a (200) texture that is directly deposited on a non-seed layer substrate. These recited features distinguish over Lin et al. '170 and Fuke et al. '049 for the same reasons discussed above in connection with Claim 1. The remaining references applied in the Office Action do not remedy the above-noted deficiencies of Lin et al. '170 and Fuke et al. '049. None of the references teach IrMnN alloys, nor the direct deposition of films having a (200) texture on a non-seed layer substrate. Accordingly, independent Claims 9 and 34, and the claims that depend therefrom, are patentable over the prior art of record.

In view of the foregoing amendments and remarks, it is submitted that Claims 1-9, 11-21, 34, 36 and 37 are patentable over the prior art of record. Accordingly, an early Notice of Allowance is respectfully requested.

In the event that any outstanding matters remain in connection with this application, the Examiner is invited to telephone the undersigned at (412) 263-4340 to discuss such matters.

Respectfully submitted,



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